DOCUMENT RESUME

ED 301 591 TM 012 533

AUTHOR Ariza, Maria J.
TITLE Evaluating Limited English Proficient Students' Achievement: Does Curriculum Content in the Home Language Make a Difference?
PUB DATE Apr 88
NOTE 14p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 5-9, 1988).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Achievement Tests; *Bilingual Education Programs; Curriculum Evaluation; Elementary School Curriculum; *Elementary School Students; Followup Studies; Grade 1; Grade 2; *Hispanic Americans; *Kindergarten Children; *Limited English Speaking; Longitudinal Studies; Pilot Projects; Primary Education; Spanish Speaking
IDENTIFIERS Dade County Public Schools FL

ABSTRACT

This study followed longitudinal achievement data from Hispanic students with limited proficiency in English who participated in a pilot instructional program. The program involved bilingual curriculum content (BCC) in the home language and was initiated in the winter of 1983-84 and continued through the 1986-87 school year. Six elementary schools were randomly assigned to the BCC strategy and six were randomly assigned to the No-BCC strategy; all 12 were in the Dade County (Florida) Public School system. Two cohorts of Hispanic kindergartners beginning kindergarten in the winter and fall of 1984 were followed for 2 years (until the end of their respective second grade). A pretest-posttest comparison group design, using content achievement tests, was used. Achievement tests were administered in English and Spanish. A separate one-way analysis of covariance was conducted for each test. At the end of the second grade for students in the first cohort and first grade for students in the second cohort, there was no appreciable improvement in achievement for students in the BCC program. Students in the control curriculum scored no worse than did their BCC counterparts in achievement tests. The amount of time devoted to home language instruction should be increased, and the methodology and materials used in bilingual curriculum instruction should be examined. Descriptions of the five achievement tests used and three data tables conclude the document. (TJH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED301591

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
✓ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
MARIA J. ARIZA
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Evaluating limited English proficient students' achievement: Does curriculum content in the home language make a difference?

Maria J. Ariza
Dade County Public Schools
Miami, Florida

Paper presented at the Annual AERA Convention
New Orleans, April 1988

TM012533

BEST COPY AVAILABLE

Evaluating limited English proficient students' achievement: Does curriculum content in the home language make a difference?

This manuscript will present the achievement results of a sample of Hispanic students who were limited English proficient (LEP) in kindergarten, and evaluated longitudinally to assess the impact of a pilot instructional program (bilingual curriculum content in the home language, BCC Pilot Program). The study was initiated in the winter of 1983-84 and continued through the 1986-87 school year. Two groups of students participated in the study.

The results of the longitudinal project indicated that achievement displayed by LEP project students in the content areas did not seem to be influenced by the use of the home language. Furthermore, it was found that as designed in the present study, the use of the home language is not sufficiently adequate to produce differences in achievement. Based on these results, recommendations were made to modify the program; and district staff is currently implementing these recommendations.

Sample

Schools

Questionnaires on services to LEP students were sent to the district's 154 elementary schools; 131 questionnaires were returned, reflecting an 85% response rate. Schools were then selected for participation in the pilot project based on an adequate number of Hispanic kindergarten students at ESOL Levels I and II; twenty schools were left in the sample.

These twenty schools were subsequently grouped by socioeconomic strata (based on percent of students receiving free/reduced priced lunch), and percent of LEP students. Twelve schools were matched in this fashion and then selected; six of the schools were randomly assigned to the BCC strategy and the other six schools were assigned to the No-BCC strategy.

Teachers

After the schools were selected, evaluation staff visited the schools and/or interviewed administrators to discuss teacher and student participation. Teachers were selected on the basis of their training and years of experience, so that BCC and No-BCC school teachers would be comparably qualified. A balance between bilingual and monolingual teachers in BCC and No-BCC was sought, but adjustments had to be made to accommodate the schools' staff resources.

Students

Students who participated in the study were Hispanic students in kindergarten classified as ESOL Levels I and II (little to no English ability). Intact classes of kindergarten ESOL students were chosen. Random selection was employed in cases where

individual students were asked to participate in the pilot project to maintain an adequate class size. Two cohorts of students participated in the project: Cohort I, starting in the winter of 1984 and Cohort II, starting in the fall of 1984. These students were followed-up for two years (until the end of their second grade respectively).

Instruments

Achievement tests were applied in English and Spanish to all students in the project. These tests included the Peabody Picture Vocabulary Test (PPVT) for kindergarten in both languages; the Test of Basic Experiences (TOBE) in Language, Mathematics, Science and Social Studies for kindergarten and first grade; the Comprehensive Test of Basic Skills (CTBS) in Vocabulary and Mathematic Comprehension in both languages and Science and Social Studies in English and La Prueba Riverside (Riverside) in Science and Social Studies in Spanish for second grade. A description of these tests appears in Appendix A.

Design

In order to compare the academic achievement in content areas of students in BCC and No-BCC strategies, a pretest-posttest comparison group design was employed. Content achievement tests were administered at the pretest (fall, except for the first year) and posttest (spring).

Analyses and Findings of the First Year

At the end of the four-month pilot project period, analysis of covariance was used to test the significance of the difference between posttest scores of the BCC and No-BCC groups on all achievement tests. Pretest scores for each group were used as covariates. A separate one-way analysis of covariance (ANCOVA) was carried out for each test. The Bonferroni F procedure (Huitema, 1980) was applied after the ANCOVAs, to correct for the multiple ANCOVAs which were carried out.

Prior to the Bonferroni procedure, BCC students had achieved a significantly higher score than No-BCC students on the TOBE Mathematics test in English. A borderline significance was found on the DCCAT Science Test in English, also favoring the BCC group; but these differences were not significant after the Bonferroni correction.

To determine comparability on Health/Safety achievement, items in the TOBE and DCCAT tests which assessed Health/Safety were selected and examined separately for BCC and No-BCC students. Chi-squares for the English and Spanish scales using the percent of students answering correctly to each item did not find any significant differences between the two groups of students. Thus performance was comparable on Health/Safety items.

Overall, at the end of the four-month project period, academic achievement of kindergarten LEP students was comparable, with or without BCC instruction. Since the implementation time of the project was limited, it was recommended that a full year of program implementation be evaluated with a new group of kindergarten students from the same schools (Cohort II). The achievement of Cohort I was also followed-up.

Analyses and Findings of the Second Year

The analyses for the second year of the study examined the achievement of students in Cohort I (now in first grade) and Cohort II (in kindergarten) separately. Within each cohort, comparisons were made between BCC and No-BCC groups. The results for Cohort I and II will be discussed respectively.

At the second year of the study, students in Cohort I had had a year and four months in the program. Due to the fact that many first grade project students were in the Chapter 1 Program, achievement data were analyzed according to BCC/No-BCC and Chapter 1/Non-Chapter 1 subsets. This breakdown resulted in a very small number of students in each subset, therefore the conclusions cannot be generalized to the total Chapter 1 Program.

The analyses of covariance which were carried out on each of the tests between the subsets revealed significant differences for BCC students participating in Chapter 1 in the DCCAT tests for Mathematics in English, Social Studies in Spanish and Science in both languages. For students not participating in Chapter 1, significant differences were also found for the BCC group in the TOBE test for Mathematics in Spanish, and in the DCCAT test for Mathematics in English.

When the Bonferroni F was applied to correct for use of multiple achievement tests, the DCCAT Science Test in English was statistically significant for Chapter 1 students in the BCC group, as was the DCCAT Mathematics Test in English, favoring Non-Chapter 1 students in the BCC group. No significant differences were found on Spanish posttests.

These findings suggest a higher level of achievement for BCC students on two of the locally-developed tests: Science (English) for Chapter 1 participants, and Mathematics (English) for Non-Chapter 1 participants. Achievement on Health/Safety items did not reveal any differences between BCC and No-BCC groups in either the English or Spanish scales.

An additional analysis was carried out to examine the effects of program characteristics in each strategy on student achievement. A multiple regression analysis was applied to the test data along with student and program information. The tests were differences appeared were used, these were the DCCAT Math (English) favoring Non-Chapter 1 BCC students and the DCCAT Science (English) favoring the Chapter 1 BCC students.

A hierarchical multiple regression was used with nine predictor variables. The variables were: school SES = percent of free/reduced priced lunch; Chapter 1 participation; TOBE-E = Test of Basic Experiences; Language Arts, English; TOBE-S = Test of Basic Experiences, Language Arts, Spanish; TLA = Time in Language Arts; TCI = Time in Combined Instruction; TM = Time in Math; BCC = Bilingual Curriculum Content Treatment; No-BCC = No Bilingual Curriculum Content Treatment.

For both regression analyses applied on the first grade data (DCCAT Math and Science, both in English), the students' English language ability was the most important variable in explaining the variation in the criterion variables (DCCAT Math = 9%, DCCAT Science = 27%) after controlling for the effects of school SES and Chapter 1. Above and beyond all other independent variables, treatment still contributed (7%) to the explanation of the variation in the DCCAT Math only. In summary, language ability appears to be the factor contributing the most to the students' successful performance on both of these tests.

PPVT scores of Cohort II students were examined to determine if there were differences in language and cognitive skills of students at the onset of the project. The means on the PPVT in English and Spanish were similar, indicating that the groups were comparable.

ANCOVAs were again used to establish whether there were significant differences between posttest scores of BCC and No-BCC groups when the pretest score was held as a covariate. The Bonferroni F procedure was also applied after all the ANCOVAs were analyzed.

Prior to the Bonferroni F procedure, a significant difference was found favoring the No-BCC group on the TOBE Social Studies Test in English. The No-BCC group also scored significantly higher on the TOBE Language Test in Spanish. Two significant differences were found favoring the BCC treatment group. These were found on the DCCAT Mathematics Test in English and on the DCCAT Science Test in Spanish. Only the DCCAT Mathematics Test in English was statistically significant after the Bonferroni tests was applied. This finding suggests a higher level of achievement for BCC students on the content-referenced test, and thus, sensitivity to the BCC treatment as it relates to the Dade County Balanced Curriculum in Mathematics.

Chi-squares were used to examine achievement differences on the Health/Safety items. Following the same procedure used in the previous year, no differences emerged between the groups on either English or Spanish scales.

With Cohort II, another hierarchical multiple regression was used employing variables similar to those studied with Cohort I. The variables examined with Cohort II students were: school SES, language of instruction, class size, teacher experience, language achievement of students and instructional time. The test

analyzed was the DCCAT Mathematics Test (English version) since this was the test that showed some possible effect for the BCC treatment.

The student's English language ability was found to have the highest degree of influence (38% of the variance); the students' Spanish language ability was also relatively strong (7% of the variance). Years of teaching experience with LEP students and years of teaching experience in general, were also found to have a strong influence on achievement (6% and 4% of the variance, respectively). The BCC treatment was found to have a more modest degree of influence on achievement (3% of the variance). School SES accounted for less than 1% of the variance. Other treatment factors, class size, time in math and combined instruction, and language use, did not appear to influence achievement.

With a full academic year in the first grade, and four months in the pilot project in kindergarten, no clear pattern of achievement emerged for Cohort I that consistently leads to higher content achievement in either the BCC or No-BCC strategy. The students' achievement was comparable in math, science and social studies. Of several factors examined, the students' ability in English was found to be the factor contributing the most to the students' successful performance on the two tests examined.

At the end of a full academic year in kindergarten, no clear pattern of achievement had emerged for Cohort II that consistently leads to higher content achievement in either the BCC or No-BCC strategy. Of several factors examined, the students' ability in English was found to have the highest influence on achievement on the Math test. The other variables that appeared to be contributing to achievement were Spanish language ability, years of teaching experience with LEP students, total years of teaching experience, and the BCC treatment.

Analyses and Findings of the Third and Final Year

The analyses of Cohort I's achievement in their final year in the project (second grade) did not reveal any significant difference between BCC and No-BCC groups before or after correcting for multiple tests. The statistical analysis used once more was the analysis of covariance. The tests examined were the CTBS, Riverside and DCCATs. Results showed that BCC and No-BCC students achieved comparable scores on tests administered in either language (including items assessing Health/Safety).

Comparisons between standardized test scores in English (CTBS) and national norms indicated that Cohort I students appeared to be scoring at instructional grade level on most tests. This indicates a good performance for these students (both BCC and No-BCC). Their Spanish scores (on Spanish versions of the CTBS) were somewhat lower.

On the ANCOVAs for Cohort II and prior to the Bonferroni correction, there were two significant differences. The BCC group scored significantly higher on the TOBE Social Studies Test in Spanish. The No-BCC group scored significantly higher on the TOBE Language Test in English. After the Bonferroni correction was applied, there were no significant differences on content area tests or language achievement scores between BCC and No-BCC groups. The comparison between Cohort II students' scores with national norms on the TOBE tests in English revealed that Cohort II students' scores were mostly in the average range, indicating less achievement for these students at this time, in comparison to the norm group.

Additional analyses conducted in the third year included the examination of graphs using z scores for mean test scores across the time span of project implementation (two and a half years for Cohort I, two years for Cohort II). After examining fourteen graphs of all tests taken for Cohort I (English and Spanish), it was concluded that there was no pattern of results which would indicate that either strategy was superior in producing greater student achievement. The same results were evident in the fourteen graphs examined for Cohort II.

A further analysis carried out included a limited repeated measures ANOVA. The factors evaluated were group (BCC, No-BCC), year (year one, 83-84; year two, 84-85; and year three, 85-86 for Cohort I - Cohort II only had year one, 84-85; and year two, 85-86) and tests (fall and spring each year for a total of six for Cohort I and four for Cohort II).

The tests selected for these analyses were chosen on the basis of ANCOVAs for both cohorts carried out for each year that the pilot project was in operation. Cohort II's test scores on selected tests (those that appeared to be significant prior to statistical correction and a DCCAT test in 1985-86) were chosen for the longitudinal analyses. These tests suggested a greater likelihood of revealing any significant differences which may have emerged across the two years of project implementation for Cohort II. Three tests were thus chosen: TOBE Language in English, TOBE Social Studies in Spanish and DCCAT Science in Spanish.

There was no significant group difference on achievement scores across the four testing points for any of the tests examined. Further analyses on additional tests did not seem to be warranted by the data. These findings based on longitudinal analyses further substantiate previous conclusions that no clear pattern of results had emerged which indicate that either strategy (BCC, No-BCC) lead to higher level of student achievement.

The final analyses investigated the effect of program characteristics in each strategy on student achievement. Two factors were examined: the student's English proficiency (expressed by the number of years in the ESOL program), and BCC instruction (expressed by the number of years in BCC).

The number of years of ESOL instruction that a student could have had was chosen as one of the factors. Scores from both BCC and No-BCC groups (combined) were used for the analysis. Tests for 1985-86 were utilized because they allow for a greater range of values on time for instruction in ESOL (three and two years for Cohorts I and II, respectively).

Again, the statistical procedure employed to analyze these data was a limited repeated measures ANOVA with three factors. The factors were group (BCC, No-BCC), time in ESOL instruction (one, two, or three years for Cohort I and one or two years for Cohort II), and tests (fall and spring; two for each cohort).

The analyses of achievement results by student English proficiency (see Table 2), using BCC and No-BCC students' scores combined, showed strong and significant results in both cohorts. On standardized tests in English, students with one year of ESOL instruction achieved higher scores than students with two and three years of ESOL instruction. It seems that students who acquire English skills quickly also achieve high scores on content area tests, two years after exiting the ESOL program. The number of years students participated in ESOL (used as an independent measure of English ability) may also be an indicator of achievement on content area tests; however, further investigation of this finding is suggested.

Examination of whether length of time in BCC, as seen in Table 3, adds significantly to achievement of students in the BCC strategy presented similar results to time in ESOL instruction, although not as strong. In Cohort I, only mathematics was statistically significant, but the same trend was apparent in science and social studies. Students with one year of BCC instruction tended to score higher than students with two years of BCC instruction.

For Cohort II the pattern was stronger and there was one more statistically significant difference on the TOBE Social Studies Test in English. Overall, students who have one year of BCC instruction achieve higher scores than students with two years of BCC instruction. The latter group of students had lower scores and as many were still ESOL Levels III and IV, may require different methodology in the second and/or third year of content support instruction.

In summary, at the end of second grade for students in Cohort I and first grade for students in Cohort II, there is no evidence that leads consistently to higher achievement for students receiving bilingual curriculum content instruction. Students in both strategies (BCC and No-BCC) achieved comparable scores on tests administered. These findings were related to the program's characteristics and its implementation. Recommendations were made to increase the amount of time devoted to home language instruction and to examine the methodology and materials used in delivering bilingual curriculum content instruction.

References

Cole, N. S., Trent, E. R., & Wadell, D. C. (1984). La Prueba Riverside de Realizacion en Espanol Nivel 8. Chicago: Riverside Publishing Company.

CTB/Mc Graw-Hill (1973) Comprehensive Tests of Basic Skills (CTBS) Level C Form S. Monterey, CA: Del Monte Research Park.

CTB/Mc Graw-Hill (1978) Comprehensive Tests of Basic Skills (CTBS). Espanol Monterey, CA: Del Monte Research Park.

Dunn, F. & Dunn, L. M. (1981) The Peabody Picture Vocabulary Test-Revised. Circle Pines, MN: American Guidance Service.

Huitema, B. (1980). The Analysis of Covariance and Alternatives. New York: Wiley and Sons, Inc.

Moss, M. (1978). Tests of Basic Experience (TOBE). Monterey, CA: CTB/Mc Graw-Hill.

Tests of Basic Experience (TOBE) - which measure the students awareness of world around them, through testing skills in the three curriculum areas of mathematics, social studies and science; and in the language arts. English and Spanish versions of all tests are available (Moss, 1978). Each TOBE is composed of 26 items in a multiple choice format. Tests are group administered; the examiner reads the questions and students select the correct answer from one of four options presented in pictorial form. Generally, administration of each test lasts between 25 and 40 minutes.

Dade County Content Area Tests (DCCAT) - These tests were designed by the evaluators to measure student achievement as it relates to the DCPS Content Area Balanced Curriculum Objectives. Tests were developed in English and Spanish for the curriculum areas of mathematics, social studies and science. DCCAT tests for kindergarten have 16 multiple choice items; first and second grade tests have 20 multiple choice items. Tests are administered in groups. The examiner reads the question and students select the correct answer from one of three options. Test administration usually lasts between 15 and 20 minutes.

Comprehensive Test of Basic Skills (CTBS) - The CTBS is a standardized test which measures mathematics, social studies, science and language arts. The test is available for grades 1 through 12 and each component has a different number of items. The vocabulary test (in English and Spanish) requires 15 minutes to complete its 33 multiple choice items. Mathematics Concepts and Applications (also in English and Spanish) has 25 items and requires approximately 40 minutes. Responses to the social studies and science tests (available only in English) are usually presented in pictorial form; these tests last 30 minutes each. All CTBS tests are group administered.

La Prueba Riverside (Riverside) - The Riverside tests are standardized content and language achievement tests in English and Spanish. The science and social studies tests in Spanish were used. Each test consists of 28 multiple choice items which are answered in pictorial form. The tests are group administered and last approximately 30 minutes each.

Peabody Picture Vocabulary Test (PPVT) - The PPVT is designed to measure a student's receptive vocabulary (Dunn & Dunn, 1981). It also has been used extensively to provide an estimate of general cognitive ability as demonstrated through vocabulary acquisition. By permission of the authors, the PPVT was especially adapted for this project by evaluation staff. Two forms of the test were developed: one in Spanish and one in English. The test is administered individually. The 20-item test and scoring procedures were adapted from the original test.

Table 1

Summary of Selected Achievement Results for the BCC Pilot Project using ANCOVAs

Test	Cohort	Group with Higher Achievement	F	p
TOBE Math English [a]	I	BCC	5.06	.03
DCCAT Science English	I	BCC	3.60	.06
DCCAT Math English [b]	I	BCC - Chapter 1	5.10	.03
DCCAT Science English	I	BCC - Chapter 1	9.63	.004 [d]
DCCAT Science Spanish	I	BCC - Chapter 1	4.18	.05
DCCAT Social Studies Spanish	I	BCC - Chapter 1	4.62	.04
TOBE Math Spanish	I	BCC - Non-Chapter 1	4.40	.04
DCCAT Math English	I	BCC - Non-Chapter 1	13.71	.001 [d]
TOBE Social Studies English	II	No-BCC	8.41	.004
TOBE Language Spanish	II	No-BCC	6.46	.01
DCCAT Math English	II	BCC	11.74	.001 [d]
DCCAT Science Spanish	II	BCC	6.19	.01
TOBE Social Studies Spanish [c]	II	BCC	8.30	.005
TOBE Language English	II	No-BCC	5.88	.02

Note: All results are based on students who took both the pre and posttest for the designated year.

[a] Selected ANCOVA results for the first year of the project.

[b] Selected ANCOVA results for the second year of the project.

[c] Selected ANCOVA results for the third year of the project.

[d] Difference remained significant after correcting for multiple tests (Bonferroni F).

MA:dt

Table 2

Repeated Measures ANOVA Comparing
Spring Mean Scores by Level of English Proficiency: Years in ESOL
Cohorts I and II

Achievement Test	Years in ESOL [a] 1 n	1 M	2 n	2 M	3 n	3 M	F value	Probability Level
Cohort I								
CTBS in English								
Mathematics	26	17.00	35	16.14	45	14.19	7.01	.001
Science	24	18.08	32	15.45	42	13.28	16.38	.0001
Social Studies	27	16.65	32	15.55	45	12.77	13.90	.001

Achievement Test	Years in ESOL [b] 1 n	1 M	2 n	2 M	3[c] n	3[c] M	F value	Probability Level
Cohort II								
TCBE in English								
Mathematics	18	19.69	76	15.82			12.25	.0001
Science	17	21.35	78	17.91			8.24	.005
Social Studies	19	19.76	95	16.08			11.21	.001

Note: Mean scores for both cohorts are based on BCC and No-BCC students' scores combined. The scores used were gathered in spring 1985-86.

[a] Cohort I students in 1985-86 could have had 1, 2 or 3 years of ESOL instruction.

[b] Cohort II students in 1985-86 could have had 1 or 2 years of ESOL instruction.

[c] Many Cohort II students with two years of ESOL will receive a third year of ESOL instruction.

(Table 7 in the Evaluation of the Bilingual Curriculum Content (BCC) Pilot Project A Three Year Study Final Report)

Table 3

Repeated Measures ANOVA Comparing
Spring Mean Scores by Years of BCC Instruction
Cohorts I and II

Achievement Test	Years of BCC Instruction 1 n	1 M	2[e] n	2[e] M	F value	Probability Level
Cohort I						
CTBS[a]						
Mathematics[b]	29	17.03	21	13.83	9.89	.003
Science[c]	24	16.44	24	14.29	3.03	.089
Social Studies[c]	23	15.54	25	14.20	1.65	.20
Cohort II						
TOBE[d]						
Mathematics[b]	43	16.95	8	14.25	4.61	.037
Science[c]	47	19.21	9	14.55	14.85	.0001
Social Studies[c]	55	17.01	13	14.00	8.10	.006[f]

[a] CTBS 1985-86 spring scores in English for Cohort I.

[b] Years of BCC instruction in mathematics was used in calculating differences on mathematics test as a function of years of instruction.

[c] Years of BCC instruction in combined instruction was used in calculating differences on science and social studies tests as a function of years of instruction.

[d] TOBE 1985-86 spring scores in English for Cohort II.

[e] One student had three years of BCC instruction in mathematics and his/her score was included in the group with two years on BCC instruction in mathematics.

[f] A significant interaction was found on this test which renders the effect of years of instruction uninterpretable.

(Table 8 from the Evaluation of the Bilingual Curriculum Content (BCC) Pilot Project: A Three Year Study Final Report)